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MODES OF LIFE IN THE MOROCCAN COUNTRYSIDE INTERPRETATIONS OF AERIAL PHOTOGRAPHS

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During the course of a year's sojourn in Morocco the writer had an opportunity for aerial reconnaissance of regions difficultly accessible by land, in some instances beyond the limits of French penetration, and unknown to Europeans. The character of the land forms seen therein has been described elsewhere.¹ The following pages recount the diverse modes of life in Moroccan mountains and plains and the human aspects of the countryside as seen from the air.

THE EXTREME MODES OF LIFE: NOMAD AND SEDENTARY

Before going into detail let us for a moment examine the two extreme modes of life, nomad and sedentary. That they are opposed to each other is obvious from the first glance. On the one hand is the nomad wandering over his pasture grounds, carrying with him in his regular migrations all that he possesses—his family, his flocks of sheep, his goats and camels, and his tent. On the other hand is the sedentary cultivator attached to his fields, his trees, and his house. These two aspects of human economy are not peculiar to Morocco of course; they are found intimately mixed on the uninterrupted belt of steppes and desert that stretches from Morocco to Mongolia.

Figures 2 and 3, on the one hand, and Figure 4, on the other, show in concrete form the opposition of these two modes of life. Here we have (Fig. 2) the black tents, 6 or 8 meters long, made of strips of fabric, wool or goat hair mixed with vegetable fiber, supported on poles. They appear against the rocky surface as little rectangles grouped in circles, each of which

¹ Jules Blache: Quelques aspects des montagnes marocaines, *Rev. de Géogr. Alpine*, Vol. 8, 1920, No. 2, pp. 225-258. Grenoble. Reviewed in the *Geogr. Rev.*, Vol. 11, 1921, pp. 455-456. See also *Idem*: De Meknès aux sources de la Moulouya: Essai d'exploration aérienne au Maroc, *Ann. de Géogr.*, Vol. 28, 1919, pp. 293-314.

constitutes a *duar*. The dwelling of the chief is the largest, those of the poorer families are correspondingly small. In the interior of the *duar* is an enclosure where the animals are picketed at night. It appears darker in the photograph because the soil, fertilized with animal manure, is tinged with verdure.

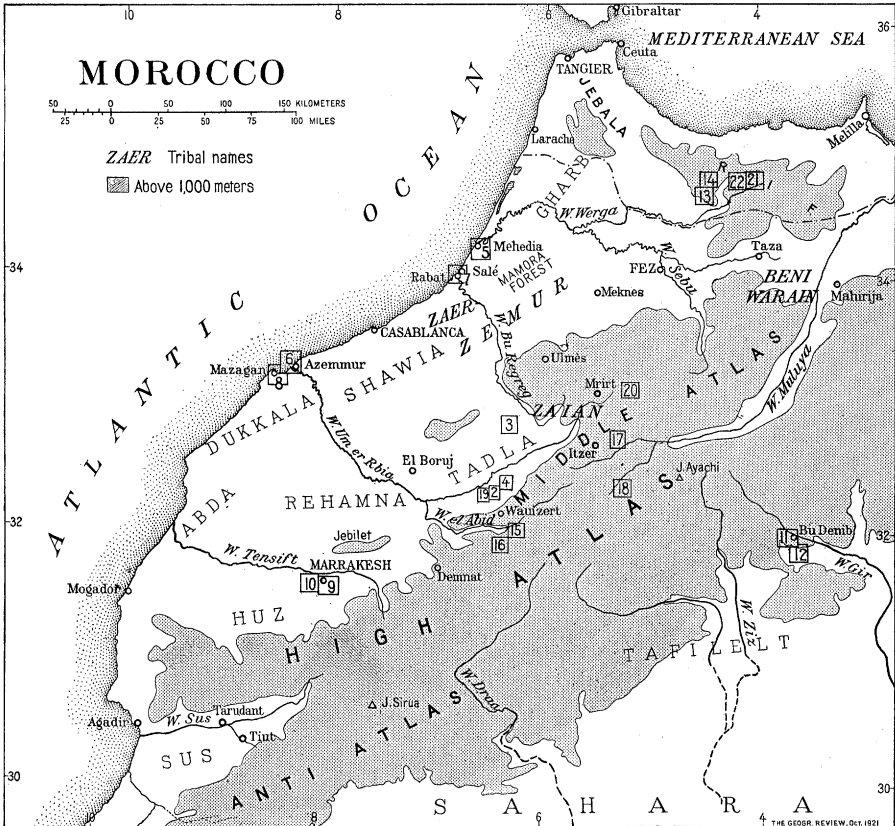


FIG. 1.—Sketch map of Morocco. The numbered squares indicate the approximate location of the landscapes shown in the following photographs, Figures 2-22.

Towards the bottom of the photograph another form of habitation is shown in the series of little cones about other enclosures. They have a tendency towards circular grouping like that of the tents but less regularly. These are the *nuala*, small cylindrical huts of branches or pressed earth surmounted by a conical roof most often of straw. A group below the large *duar* of the center of the photograph shows the association of a tent and four *nuala*. This association of the fixed shelter and the mobile shelter is somewhat surprising. The people with whom we are dealing are pastoral; the soil is not cultivated at all, it does not in fact appear to be cultivable. The slope seen in the upper left-hand corner of the picture is lined with innu-

merable roughly parallel sheep tracks. The occurrence of the *nuala* merely means that the tribe has remained for some length of time on the same pasture ground. The poorest families occupy these crude huts, less comfortable than the tent but quickly constructed and more economical.

Neither the *nuala* nor the tent, however, is exclusively the dwelling of the nomad. Many cultivators, yesterday nomads today in possession of agricultural lands, have retained the shelters of their ancestors. Tent, *nuala*,

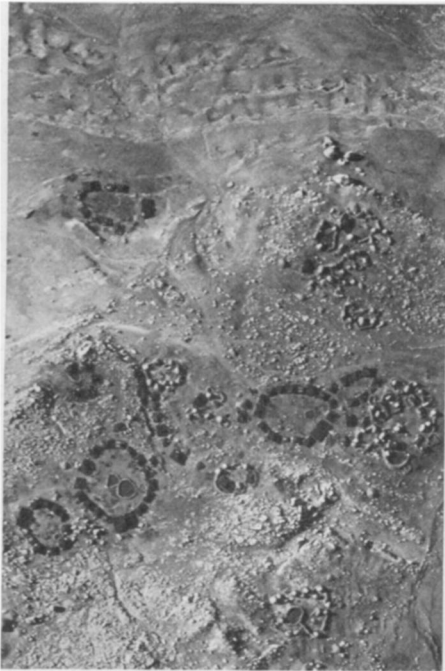


FIG. 2—*Duars* (tents) and *nualas* (earth huts) on the southern margin of the Tadla region. Vertical view. Scale approximately 1:5,000.

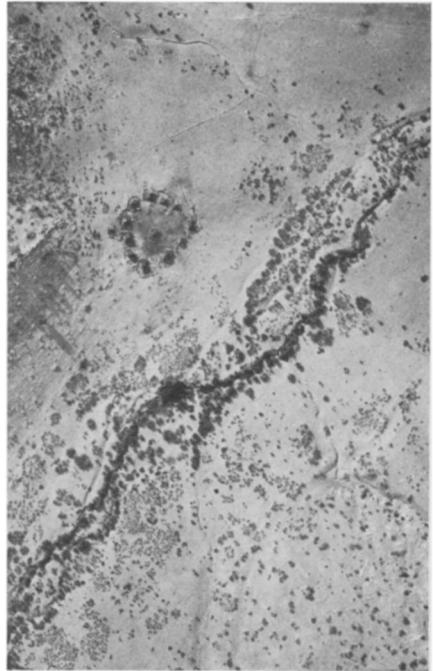


FIG. 3—*Duar* in the Zaian country. Gallery forest along a little wadi. Vertical view. Scale approximately 1:6,000.

and *gurbi*—the last with a more elongated keel-shaped straw roof—are found in Morocco among the cornfields as on the pasture grounds. They are, as we shall see, the homes of cultivators less firmly attached to the soil, those who possess neither orchards nor irrigation facilities; in other words, seminomadic cultivators who still retain important pastoral interests. Thus the sight of the tent does not necessarily signify nomadism proper; it is suited to other modes of life.

On the other hand the house, *dar*, is the sign of sedentary occupation; along with it go trees, cultivations, irrigation canals, silos. Figure 4 shows the form of the house, a rectangular structure built round a central court into which open the rooms, while the bare wall of the exterior is broken only by a single door. The walls are of adobe, rarely of stone even when it might be quarried near by. The roof, supported by horizontal beams, is covered

with thatch or branches plastered over with earth, and there are flat terraces where one may walk. The roof is difficult to construct and must be kept in careful repair. An abandoned house with collapsed roof is seen in the upper left-hand corner of Figure 4.

The elementary house type aligned on a single front is rare in Morocco. Yet it is seen in certain mountain districts, particularly in the Rif. Frequently these houses, while remaining detached, tend towards a horseshoe grouping or a square (Figs. 13, 14, and 22) approximating the plan of the *dar* in Figure 4. In like manner between the rectangular *dar* and the *kasba*—the little fortified town, walled with bastions and battlements (Figs. 21 and 22)—one finds insensible transitions, and diversity of types may even be seen in the same agglomeration.

The upper right-hand corner of Figure 4 shows us a rocky plateau, in large part sterile, whose border of houses defines a line of springs from whence water is distributed to the gardens and orchards (center of figure) and to the fields (lower part of figure). The distributing canals are distinguished in the photograph by their roadlike appearance. Lines of bushes crown the channel banks in the areas given over to the orchards wherein olives, peaches, plums, and oranges flourish. In their shade are the gardens. Fields cover all the lower part of Figure 4, being separated from the zone of orchards by a great transverse channel. Irrigation of the fields here shown is accomplished from two main distributing channels divided into branches which in turn divide into shallow ditches, almost parallel and only 2 or 3 meters apart. To ensure an equal distribution of water these are traced afresh after the fields have been tilled. The larger channels bordered by continuous banks are more permanent. In the upper right-hand corner the ground appears riddled with deep holes, and a similar appearance is presented between the most elevated part of the escarpment and a group of houses at its foot. These are the silos, pits once roofed over and kept in good order for the concealment of grain either against the investigations of the tax collectors, agents of Sultan or kaid, or for protection against the designs of a too enterprising neighbor.

DISTRIBUTION OF NOMAD AND SEDENTARY TYPES

The distribution of these two types is our next concern: where are the sedentary peoples, where the nomads? Their distribution in Algeria was formerly explained on historical and racial grounds. The sedentary peoples were the ancient occupants of the country; the nomads were the Arabs, descendants of tribes who invaded the country as "a swarm of locusts" at the beginning of the ninth century. The theory is no longer held. There have always been nomads in Barbary. Again, by the side of sedentary Berbers (Kabyles) exist nomads of the same race (Tuaregs) and sedentary Arabs.² Nomadism is not the monopoly of a race, a stage in the history of civilization, but a fruit of climatic conditions.

² Augustin Bernard: *Le Maroc*, Paris, 1913, p. 142.

It is only in the desert that nomad and sedentary peoples live side by side in opposition and as strangers to each other—the man of the plow and the man of the tent, the one in the oasis and the other on his meager pastures.



FIG. 4—Houses (*dars*), orchards, irrigated fields, and silos on the southern margin of the Tadla region. Vertical view. Scale approximately 1:3,500.

In the Moroccan steppes the two types may be combined in the same tribe, even in the same individual; in fact there is hardly anything but the mixed type.³ Water, under a climate which varies from that of the Mediterranean

³ *Ibid.*, pp. 145–146.

type to that of the dry steppe, is everywhere sufficiently abundant for some cultivation. There is no devotion to purely pastoral pursuits by a people to whom "dishonor enters with the plow." The Moroccan nomads all cultivate the land a little at some season of the year.

At the same time there are few agriculturists who are strangers to some aspects of pastoral life. How could it be otherwise in a country sparsely populated, where the cultivated areas occupy only a limited part of the surface? Extensive stock-raising represents the most natural, the most general, and the most historic method of utilizing empty spaces in the neighborhood of cultivated land, whether sterility be the result of climate, of soil, or of man. The sedentary peoples have their flocks and their shepherds. Most often the flocks return at night to the interior courtyard of *kasba* or *dar*, which is designed not only as a fortress but also as a corral. Not uncommonly the flocks are truly nomadic, pastured far from the cultivated fields. Then it is prudent to accompany them with a considerable force, for this is a country where "garder les troupeaux" is not an idle phrase: a part of the tribe, even the entire tribe may accompany the flocks. Thus we have a semisedentary type which grades into the seminomadic.

We shall now proceed to an examination of the different modes of life in the great natural regions of Morocco, observing them as they are manifested in the landscape by the form and disposition of the dwelling place, the character of the agriculture, and the general aspect of the country. Between Sahara and Mediterranean there are, as we have already said, delicately graded transitions.

RURAL LIFE IN THE MOROCCAN MESETA

The plains and plateaus rising gently from the Atlantic and enclosed north and south by two mountain systems, the Rif and the Atlas, form the richest and most populated part of Morocco. It has been called the Moroccan Meseta by analogy with the central Spanish plateau, the Iberian Meseta.⁴ It is an ancient penepain for the most part covered with comparatively recent, horizontally disposed sediments; but the ancient surface is exposed on a section of the coast, in the plateau of Ulmes and in the mountainous relief of the Jebilet, to the north of Marrakesh. On the border of the Atlas, Quaternary alluvium defines the limits of a recently emptied lake: this is the Tadla. To the south of the Rif a strait connecting the Atlantic and the Mediterranean opened at a recent epoch (Miocene): the couloir of Taza and the alluvial plains of the Lower Sebu recall the existence of this predecessor of the Strait of Gibraltar.

The surface of the Meseta is comparatively well watered by winter rains of the Mediterranean type. The yearly rainfall amounts to 400–600 millimeters distributed over 50–80 days, and it is supplemented by heavy dews. In consequence we have a country where irrigation is not indispensable for

⁴ Louis Gentil: *Le Maroc physique*, Paris, 1912, p. 4.



FIG. 5



FIG. 6

FIG. 5—Mouth of the Sebu. In succession from the ocean border are cordon of wooded dunes, lagoons, agricultural plain, edge of the Mamora forest. Altitude of airplane 1,500 meters.

FIG. 6—The monotonous stretches of the agricultural plains of the littoral broken only by the white patch representing the city of Azemmur situated on the left bank of the Um er Rbia, which is here seen emptying into the ocean on the right. At the other extremity of the bay Mazagan is faintly visible as a light-colored band. Altitude of airplane 1,200 meters.

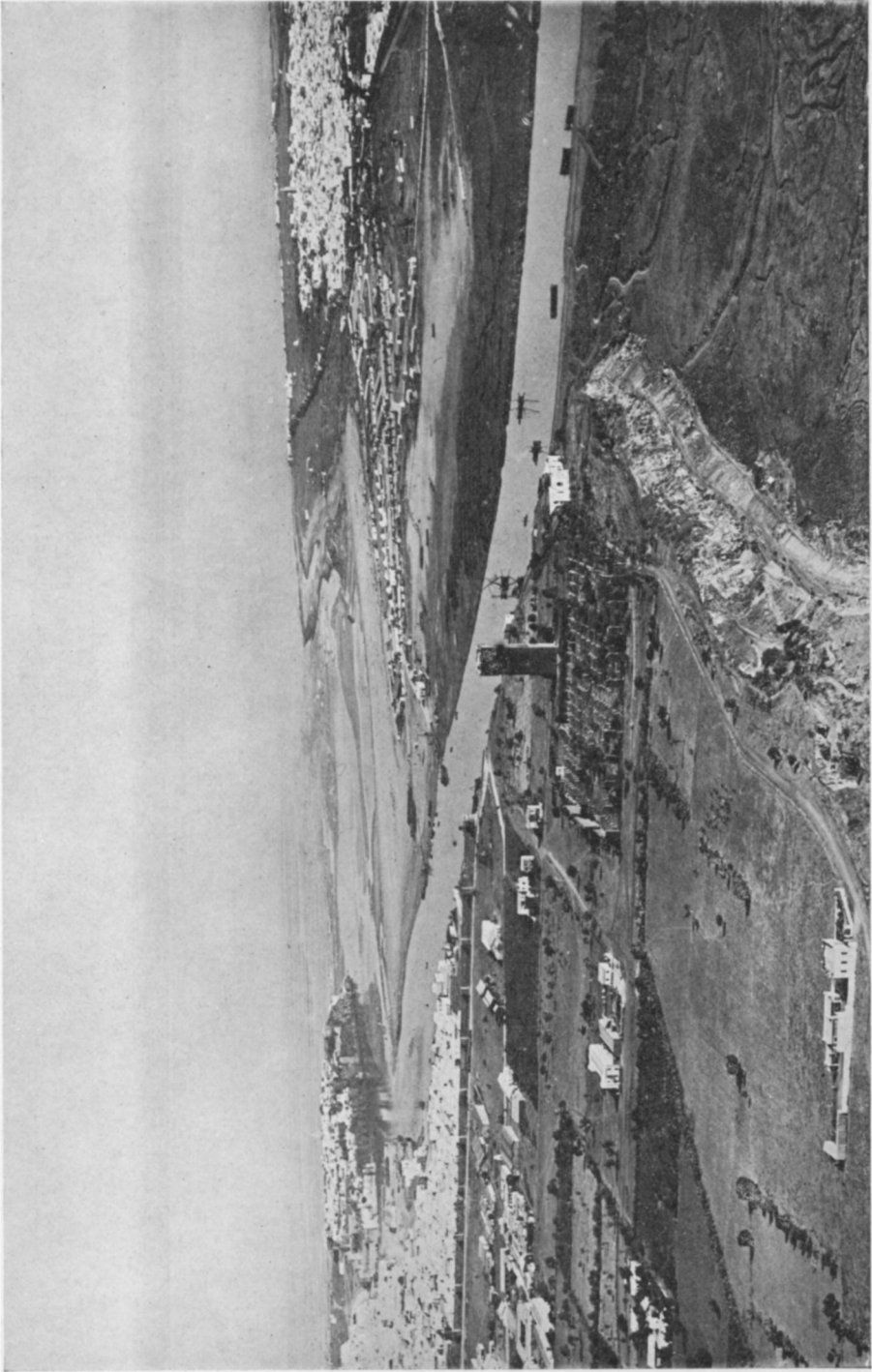


FIG. 7.—Mouth of the Bu Regreg which separates the towns of Salé (to the right) and Rabat (to the left). In the center is the famous tower of Hassan (see photograph in the *Geographical Review*, Vol. 8, 1919, p. 28). Altitude of airplane 150 meters.

agriculture, cereals in particular. The Atlantic border, the best-watered section, is furthermore favored in respect of the soil; the *tirs*, or black earth, and the *hamri*, or red earth—whose origin is still a matter of debate—are much more extensively distributed than the sandy *remel* or the stony *harrucha*. The plains of Abda, the Dukkala, the Shawia, the Gharb are the heart of agricultural Morocco. It is only in the interior plains to the south of Wadi Um er Rbia and to the north on the plateaus of El Boruj and Ulmes that, in default of regular rains and deep soils, cultivation, outside of some rare irrigated spots, becomes really meager.

What manner of life is developed on the most fertile of these plains, areas where neither soil nor climate could be more propitious for agriculture? Traveling over the vast open surfaces one sees uncleared stretches clustered with *dum*, or dwarf palm, and realizes with surprise that cultivation everywhere bears a nomadic aspect. The cultivator dwells in the *gurbi* or more commonly in the tent. Houses, domiciles of large proprietors, are rare and always isolated: there are no villages. Flocks of sheep, goats, cattle are numerous, and the periodic migration known as transhumance is general. The inhabitant of the rare oases of cultivation in Ulmes and El Boruj, infertile steppes mainly occupied by the gazelle and nomad flocks of sheep, is distinguished from the dweller of the fertile Atlantic plains, Dukkala or Shawia, only by the unequal proportion of agricultural and pastoral resources. All cultivate the soil and practice transhumance more or less, and all dwell under the nomad tent in the same wide-horizoned steppe land.

Everywhere great stretches of good land are sacrificed to the pastoral life. Even the richest regions, Abda and Dukkala, where two-thirds of the land ⁵ has been cleared and where "it is sufficient to throw grain in the air to have it germinate," have been occupied until recently by mobile tribes of whom a remnant survives today on the now limited pastures.⁶ The Shawia and the Gharb have in particular remained the domain of instable populations. In the Shawia the fields of corn, maize, and beans are interrupted by great stretches of ground covered with *dum* and sprinkled with marshes (*daias*) which serve as watering places for the stock. Each *duar* has its sheep, goats, and cattle. The richest lands of the Gharb, notably along the lower Sebu, were chiefly devoted to stock before the recent installation there of some French farms. The back country of Rabat, where the *tirs* is rare and the old rock outcrops more extensively, is the domain of the Zaers and Zemurs, seminomads, whose cattle and sheep migrate the greater part of the year in a circle defined by the relative humidity of the soil. It is practically only along the wadis that one finds their restricted fields of barley near the irrigated gardens.⁷ Farther north seminomads are still disputing the great cork-oak forest of Mamora; before French occupation the Zemurs, the latest

⁵ Conférences franco-marocaines, I: L'œuvre du protectorat, Paris, 1916, p. 197.

⁶ J. Goulven: La région des Doukkala, *Ann. de Géogr.*, Vol. 29, 1920, pp. 127-138; reference on p. 134.

⁷ Conférences franco-marocaines, p. 193.

conquerors, found there summer pastures and haunts whence they could levy ransom on the neighborhood. The plain of Meknes, dry but still cultivable at all times without irrigation, is very irregularly exploited.⁸

What is the cause of this prevading pastoral tinge of life on the Meseta? It is perhaps possible to disentangle the historic, social, and geographic causes. In the first instance the pursuit of agriculture has always been more or less precarious on the great plains bordering the Atlantic, open to invasion, subjected without possible succor to the various dominations that have been set up in Morocco. From the south has come the constant pressure of the nomads in quest of better pasture, that is to say a more humid climate. Victorious over the sedentary peoples because more mobile they have become semisedentary themselves, cultivating a part of the most fertile soil of the conquered territory but never completely renouncing their pastoral interests. To do so would be to lose entirely their former advantage; in his turn conquered and expelled from the land the seminomad, while his stock remains to him, has not lost all. Furthermore, when the nomad installs himself on good land he is at first likely to see in it good pasturage rather than tillage. The man of the tent not only leads a freer, less laborious life than his sedentary neighbor, he is generally richer. Besides his stock he has a saddle horse and firearms. In the region of Mahirija of eastern Morocco the nomads possess four times as many cattle per head as the sedentary people, who have been reduced by poverty to an inferior condition.⁹ Everything tends to suggest that in the Moroccan Meseta it is overpopulation with its consequent impoverishment of the newcomers into the territory, that has forced them to the plow. Possibly the passage from nomadism to agriculture—quite early in western Europe, more recent and more complete in many of the Mediterranean countries—is everywhere related to this cause.

We must add emphatically that here in this part of Morocco the agriculturist can revert to nomadism without difficulty; there is nothing to attach him permanently to a fixed piece of ground. Under natural conditions trees are rare; they are limited to certain figs, whose roots penetrate sufficiently deep to resist the summer drought, and to some thorny plants (cactus, aloes), which serve to make enclosures for the cattle. Irrigation is impracticable. The only permanent sources of water are the wells, often sunk to great depths and everywhere necessary for the supply of drinking water. The appearance of irrigation canals and orchards means that there the life of the agriculturist takes on a more settled aspect. A similar relationship has been noted in Algeria between the farmer who cultivates cereal crops only and the fruit grower; the former dwells in a *gurbi*, the latter in a house.¹⁰

⁸ *Ibid.*, p. 191.

⁹ *Bull. Soc. de Géogr. du Maroc*, Vol. 2, 1920, pp. 271-275.

¹⁰ Augustin Bernard and Edmond Doutté: L'habitation rurale des indigènes de l'Algérie, *Ann. de Géogr.*, Vol. 26, 1917, pp. 219-228; reference on p. 222.

THE TOWNS OF THE MESETA

However primitive the exploitation of these Atlantic plains, they yet constitute the heart of Morocco, the basis of the Sherifian Empire—the *Bled Makhzen*—the only territory where the authority of the Sultans ever made itself felt in a permanent manner. There the rulers built their capitals, there are the towns of Morocco. They are few in number; but the gardens and orchards which surround them, the high walls, the close-crowded white houses contrast so startlingly with the monotonous steppe and its obscure sprinkling of tents and *gurbis* and rare *kasbas* that the Moroccan towns give



FIG. 8—The Portuguese fortress of Mazagan (sixteenth century). Altitude of airplane 250 meters.

the impression of an entirely different world, a life completely distinct from that of the fields. The transition which in Europe leads from the village to the country town and from the town to the city is here absent. The towns are not prosperous agricultural centers, market places that have grown slowly to their present prominence, but the creation of their Sultan builders. In Morocco urban settlement has, in general, had an entirely different history from rural settlement.

Fez, the capital, was founded in 808 by Mulai Idris, son of an Arab of the Hejaz, patron saint of Moslem Morocco. Peopled by Moslems of Europe and Tunis who long disputed its possession, the old town (Fez el Bali) is still divided into two centers separated by walls and united only by a single bridge across the Wadi Fez. On the one side is Fez el Karauyine, of the eastern Moors; on the other Fez el Andalus, of the Spanish Moors. Some centuries later Fez el Jedid, the new town, was built outside and peopled

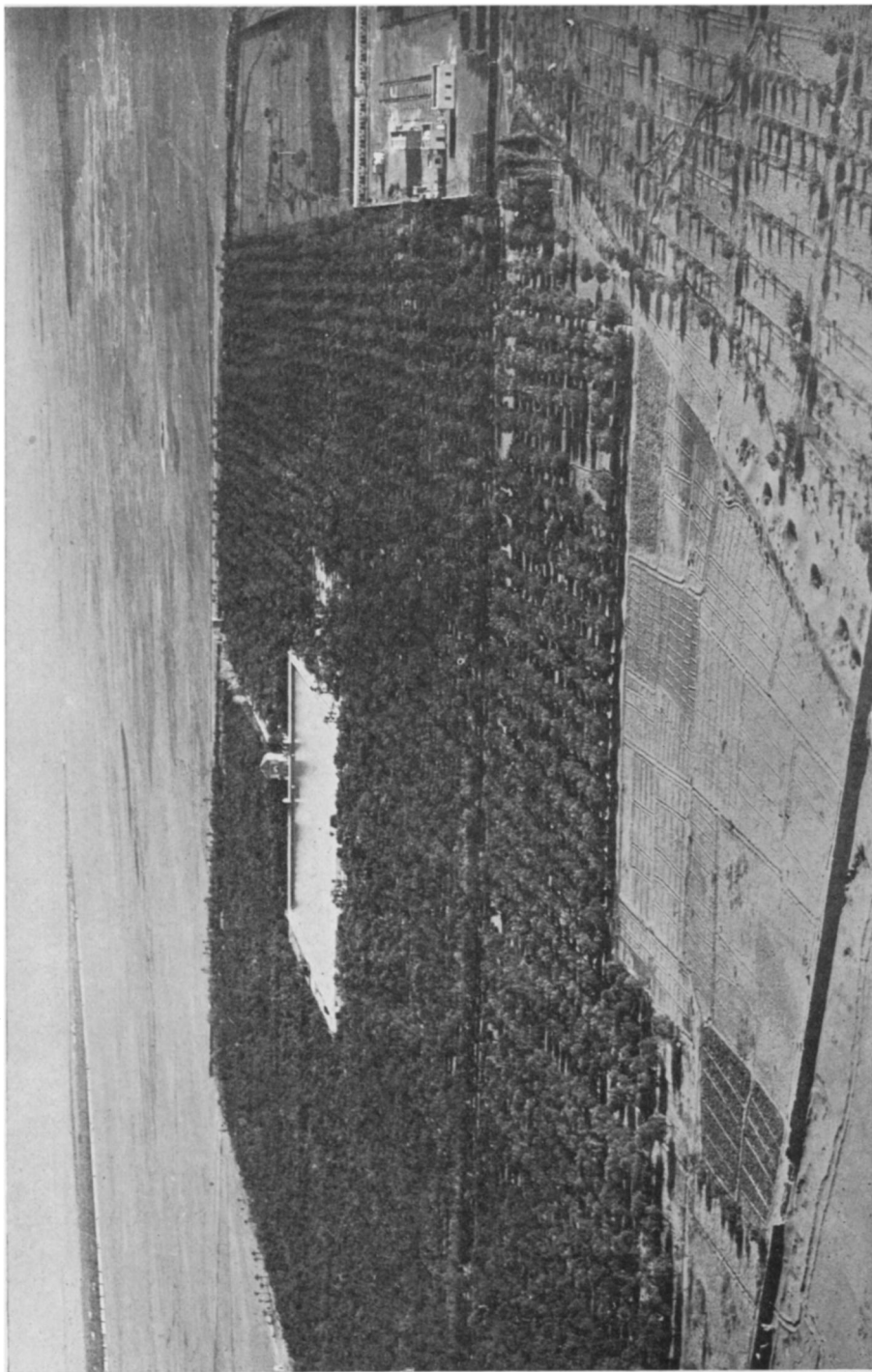


FIG. 9—Orchards at Marrakesh round a reservoir supplied by *foggaras*, the funnel-shaped openings of which are seen in the foreground. In the foreground are also irrigated fields. Altitude of airplane 250 meters.

by soldiers, negroes, and day laborers. The whole city counts some 100,000 natives within its still imposing walls in the midst of olive and orange groves which shelter palatial edifices. The middle ages still live in its narrow streets running between moldering walls, in the corporations and shops, in the markets (*suks*), in the Moslem colleges (*medersas*).

Meknes (Mequinez), the old capital of Mulai Ismail (seventeenth century), the ruins of whose palace cover a whole section, is known as the town of 40 kilometers of ramparts. Ruins of ancient fortifications to this extent may be traced at some distance from the present walls. The town is also known for its tree-planted streets and its encircling olive gardens.

Rabat, Ribat el Fath, the camp of victory, built in the twelfth century by Yacub el Mansur on the banks of the Bu Regreg, is distinguished as a seat of the arts and letters. It stands face to face with Salé, the white, a nest of pirates who furnished the markets with Christian slaves up to the nineteenth century (Fig. 7).

Like Salé on the Bu Regreg, Azemmur on the lower course of the Um er Rbia and Mehedia on the lower course of the Sebu are river ports formerly accessible to maritime navigation when the requirements were less exacting than they are today. They were the more esteemed by mariners because the regular coast offers no other shelter against the west winds than such open roadsteads as those of Casablanca and Mazagan (Fig. 8). These last towns—with a population of disparate elements, largely commercial, without aristocracy or culture—are alien to the traditional religious character of the cities of Fez, Meknes, Rabat, and Salé. Casablanca (Dar el Beida, the ancient Anfa) was the port of Shawia, before it was chosen as the base of European penetration. Mazagan is the port of Dukkala. It was founded in the sixteenth century by the Portuguese and held by them, their last stronghold in the Dukkala country, until the middle of the eighteenth century. The massive walls still remain. The modern revival of Mazagan has been rapid. The prosperous port looks over towards its former rival Azemmur, where commerce flourishing in the Portuguese days has been shut out by the bar across the mouth of the Um er Rbia.

THE SOUTH OF MOROCCO

Dryness and heat increase as one travels southward. Beyond the Um er Rbia, save for the Atlantic fringe of the Dukkala and Abda, irrigation becomes necessary if harvests are to be plentiful and sure. Yet in all southern Morocco farming without irrigation persists; it is practiced, within restricted limits to be sure, up to the Sus. But the steppe, dotted with jujube trees, becomes more desert; cultivation progressively diminishes, pastoral pursuits taking its place over vast stretches. At the same time irrigation works assume greater importance. The cultivation thus made possible is accompanied with fruit growing—dates, oranges, olives, apricots. Thus shapes itself the contrast between sterile steppe and nascent oasis. A new landscape appears with features more sharply defined than north of the Um er Rbia.

The Meseta is the domain of a population comparatively homogeneous over large areas: agriculturists possessing live stock and pasture grounds, living in the tent or *gurbi*. Here distinctions begin to appear. The farmer who, thanks to his irrigation canals (*seguías*), can water his fields regularly is definitely sedentary. He keeps his cattle and may even carry on extensive transhumance; but his precious orchards, his patient irrigation works, root him to the soil. He builds houses with flat terraced roofs and abandons the shepherd's tent. He still grows cereals, but crops are precarious; he counts on precipitation from storms and water from the wells to supply his little property.

Such are the fundamental features of the country to the south of the Um er Rbia. Let us look at the regional varieties. The Rehamna, to the north of Jebilet, and the Huz, or plain of Marrakesh, to the south are well differentiated from the great agricultural lands of the north. On the horizontal plains covered with alluvium from which emerge the black masses of the Jebilet, mountains drowned in detritus, good land is not uncommon, especially in Bahira, the western part of Rehamna. But water is deficient, and cultivation is sparsely distributed through the scant pasture sprinkled with jujube trees. Irrigation is difficult; the dwindling Tensift is already brackish and unsuitable for watering purposes in the summer. The population is correspondingly inclined towards nomadism. They practice a little agriculture; but the wheat must be sown thinly, and the maize is fed to the cattle unless some providential storm swells the grain. Wells serve for supply of the little properties; water is drawn by hand in sewn skins. In the Jebilet dikes and canals are constructed to carry to the fields the storm water falling on the mountain slopes. But when rain falls it is more particularly the pastures that benefit. Flocks and herds then gather to Bahira from all the surrounding country unless their summer migration has carried them to the Jebilet to seek, for lack of better fodder, the tough but never-failing *Stipa tortilis*, or towards Abda and Dukkala where dews support a more luxuriant herbage.¹¹

Above the alluvial levels of the plain of Huz rises a large town, Marrakesh, the red city, an oasis supported by the Atlas waters collected in a multiplicity of underground conduits. These *foggaras* (Figs. 9 and 10) are the hidden bond by which an immense palm garden is related to the distant mountains. The numbers of blacks as well as Berbers, the adobe houses, the silent orchards of orange, citron, and olive trees enclosed in rigidly geometrical walls (Fig. 9) give the capital of the south an air suggesting the approach to Saharan conditions.

To the south of the Atlas is the Sus, the most southerly plain of Morocco, enclosed to the south by that comparatively recent offshoot of the Atlas, the Anti-Atlas. It also presents a generally uniform alluvial surface broken, however, by certain limestone undulations. Cultivation without irrigation

¹¹ *Bull. Soc. de Géogr. du Maroc*, No. 10, pp. 65-87, *passim*.

persists for certain cereals. Gardens under the fig trees are supplied at the cost of considerable pains with water from the wells. The dry lands are devoted, as elsewhere, to extensive pasturing of goats and sheep; but they lose the steppe aspect that prevails in the north. One tree in particular, the argan, associated with brushwood and the cypress-like thuja, prospers on the driest calcareous soils, where it forms a veritable forest cover. The oil furnished by its nuts is an essential food resource for the Berber Chleuh who people southern Morocco.



FIG. 10—Part of the city of Marrakesh showing the urban character of the dwellings, the walls, *foggaras* (indicated by the line of funnel-shaped openings), and orchards. Vertical view. Scale 1:6,200.

The axis of the plain occupied by the Wadi Sus is a ribbon oasis, a little Egypt, which dies out downstream. Upstream the oasis ramifies into branches extending far up into the mountains. The Atlas border is the scene of a particularly active life. The stone or adobe houses are most often grouped round a sanctuary or near the solidly built residence of a kaid. The oases are planted with olives, the oil from which is sold at Marrakesh.

The left bank, less well watered by the streams from the Anti-Atlas than is the right bank from the Atlas, has only one oasis, though this is a fine one, Tiut. Tarudant, capital of the Sus, is a fortress.

From the Sus a temporary emigration is directed towards the Gharb and the province of Oran; and there is a definite stream of permanent emigration to the Moroccan towns, where the emigrants find occupation as vendors of oil and dates or as traders in copper wares.¹²

On the Saharan slopes of the Atlas, that is to say in the oases of Draa and

¹² Conférences franco-marocaines, pp. 361-384.

Taflelt, the progression that we have followed towards the life of the desert reaches its consummation. Nomad and sedentary are perfectly specialized.¹³ The former, who has neither spring nor *segua*, cannot undertake any form of cultivation, however precarious, even in winter. The latter, confined to the oases, dwells in the *kasbas* with their square buildings of urban character (see Figs. 11 and 12).

CLIMATIC AND HYDROGRAPHIC FUNCTIONS OF THE MOROCCAN MOUNTAINS

Human establishment in the Moroccan mountains is affected by certain permanent elements. The mountain country is richer than the plains in water, in summer pasturage, and in shelter.

With more abundant rains than the neighboring plains, with a snow cover which in parts lasts for several months of the year, and with a cooler summer the mountain region offers greater facility for non-irrigated cultivations. Furthermore, the watercourses are more numerous, and their regimen more stable, than those of the plains. In general these two advantages are not put to simultaneous profit.

The Rif and the Jebala, regions of highly developed relief, much dissected as the result of prolonged erosion of a complex structure, recall certain parts of the Alps. Precipitation is heavy in the interior of the massif. These are *tell* countries. Human life there presents a highly individualized aspect, whose replica is found in Algeria in the so-called Tell.¹⁴ By preference the villages are aligned along crest summits exactly as they are in Kabylia. The house, which is quite small, is often of the elementary type with a sloping roof. The bottoms of the valleys are deserted. Olive and the fig are the principal fruit trees, with the walnut in the high valleys. The olive groves of Ferhun, north of Meknes, count some 200,000 trees. The orchards of the northern Gharb are particularly flourishing. Terrace cultivation (Fig. 14), common on the steeply inclined slopes, completes this aspect of a Mediterranean country and suggests nothing of the mobile population of the Meseta.

The Atlas is very different from the Rif from every point of view, physical and human. The mountain border is here well defined. Tabular surfaces, calcareous for the most part and almost horizontal, rise by steps to surfaces developed upon simple folds; such is the Middle Atlas. It has been described as a Jura, but it is a Jura greatly simplified as to structure and less developed as to relief (Fig. 20). Behind it the high folds of the Great Atlas present regular unbroken crests to the north, a little more cut up to the south, and are everywhere greatly elevated sometimes passing 4,000 meters in altitude. The whole exhibits certain common characteristics: regularity of structural lines and relief in a little advanced stage of evolution, wherein figure very

¹³ E. F. Gautier: Nomad and Sedentary Folks of Northern Africa: *Geogr. Rev.*, Vol. 11, 1921, pp. 3-15.

¹⁴ Marcel Larnaudé: Excursion interuniversitaire en Algérie, *Ann. de Géogr.*, Vol. 30, 1921, pp. 161-194; reference on pp. 189-190.



FIG. 11

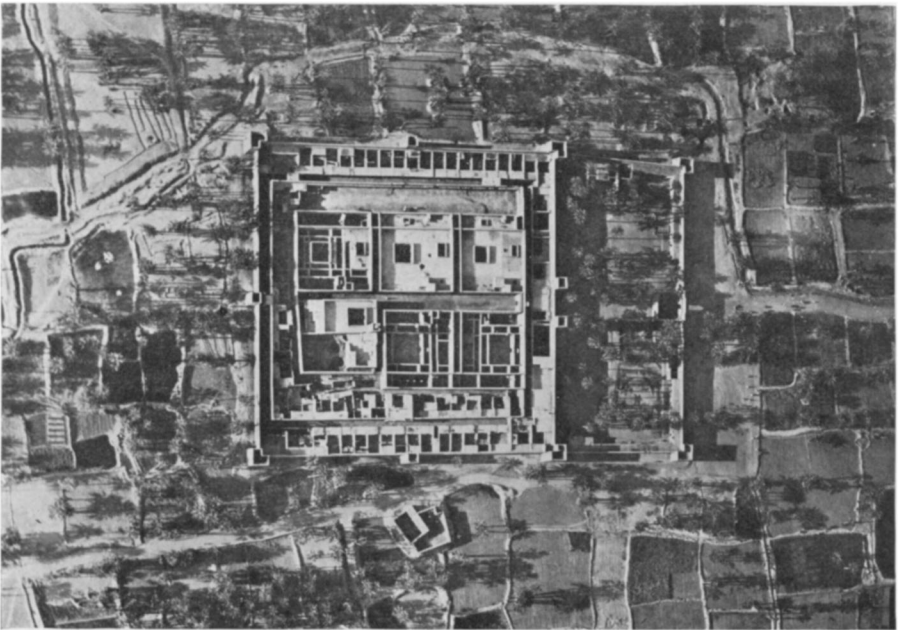


FIG. 12

FIG. 11—*Kasbas* (fortified settlements) in palm groves, vicinity of Bu Denib, Saharan slope of the High Atlas.
 FIG. 12—Vertical view showing the detail of a *kasba* seen on the right of Figure 11.

high interior valleys, plateaus, and crests little dissected except by certain impassable gorges that open into the wadis of the low country. These mountains shelter varied types of life. The slopes having the best exposure are well favored in comparison with the interior valleys, which are often very dry, and with the neighboring Atlantic plains. Figure 15 shows a country of almost *tell* character, with dispersed cultivation and storied houses. Again, we shall find some of the distinctive characteristics with which we are familiar in the Rif—villages perched on crest lines overlooking



FIG. 13—"Perched" village of Kabyle type in the valley of the Amzaz, right bank affluent of the Werga. The houses are aligned along a crest which dominates the wadi on the right. The roofs are sloping instead of flat. Resources in the neighborhood of the village are meager, but the site offers advantages as a refuge. Vertical view.

the cultivation, frequently terraced, of the slopes. But the house plan, square and flanked with bastions where isolated, is entirely different from the elementary house type of Kabylia, which would appear to be restricted to the more northern mountains. Some non-irrigated cultivation of the slopes may be observed even to the borders of the Sus. To the east and south of Marrakesh in the mountain valleys live poor agriculturists with some live stock, goats in particular (they constitute one-third of the flocks in the valley of Wadi Tessut), that are not infrequently decimated by the rigors of winter. Horned cattle are sometimes stabled in winter. These people bring their cattle and wax and honey to the fruit farmers situated at the foot of the Atlas, as near Demnat for example.¹⁵

¹⁵ *Bull. Soc. de Géogr. du Maroc*, No. 10, pp. 84-87.

The plains and sheltered valleys and the more eastward and drier mountains have nothing of the aspect of the *tell*. The interior valleys of the Great Atlas, to the east of the Muluya and the upper Wadi el Abid, are populated by agriculturists only in the oases, which are generally similar to those along the courses of the Saharan wadis. Nothing could be more different from the Rif with its deserted valleys and its narrow lines of houses strung along the crests than the square *kasbas* and the *ksur* (fortified villages) marking the course of the wadis and the single cultivated spots (Fig. 18).



FIG. 14—Terrace cultivation in the valley of the Wadi Amzaz. Note the dispersion of the orchards and the appearance of the dwellings—dispersed hamlets with houses of elementary type—in contrast with Figures 4 and 19 where the *dar* encloses an interior court. Vertical view.

In the Rif, where cultivations are not irrigated, the chief function of the mountain is as a condenser of moisture. Here, on the contrary, where irrigation is indispensable, it functions primarily in the prevention of loss through evaporation of the waters of the too rare rains by concentrating them rapidly in the steeply sloped valleys; that is it functions as a collector. The less important wadis gather sufficient water for the support of an oasis on the alluvial fan where the stream enters the main valley. The more important carry their benefits farther; such is the Wadi Saura, which, descending the southern slope of the Great Atlas, does not lose itself until far into the Sahara.

The mountain oasis acquires a distinctive aspect from its altitude: the date palm is absent; on the lower slopes its place is taken by fruit trees, at greater elevation by the walnut. Still higher—on the upper Muluya and

its affluents, for example, at an altitude of 1,600 to 2,000 meters—no fruit tree can resist the winter. These are the “bald” oases, treeless as the steppes which they furrow (Figs. 17 and 18).

On their exit from the mountains the watercourses do not lose their importance. Indeed it is sometimes increased, since the people of the better-watered mountain may dispense with the stream, while the agriculturists of the plain are dependent on it. This far-reaching beneficial influence is most apparent where the climate of the plains is driest. It is instanced in the galleries of palms stretching out from the mountains along Wadi Saura and Wadi Draa. The south of Morocco, in the Sus and the Huz, shows us the Atlas supporting the greater part of the plain. But as one proceeds to the north the country is enriched with water resources independent of those from the mountains. One might almost say that the great rivers of the Meseta, the Sebu and Um er Rbia, pass unheeded by the inhabitant of the agricultural plains which they traverse. Their influence is limited on their issuance from the mountains. Along the foot of the southern Atlas is aligned a series of large villages surrounded with magnificent orchards (Fig. 19) where also is water for cereals (Fig. 4). Among the Zaïans each cultivator has in his turn water from a common *seguia*.

THE MOROCCAN MOUNTAINS IN THE PASTORAL ECONOMY

The Rif appears to be quite like the Algerian Tell. The Moroccan Atlas resembles the latter but slightly, and in certain interior valleys changes rapidly eastward and southward to a typical Saharan landscape modified by height. As a whole the aspects of human life in the Moroccan mountains are varied, and, as we have seen, this variety is consequent on the varying usage of water for irrigation. The part played in pastoral economy is much more uniform than in the Rif. Everywhere the mountains furnish summer pasturage. Certain limestone massifs, uniformly elevated and dry, are in fact suitable for this purpose only; they are therefore dominated by the life of the plains. The Zaïans from October to April winter on the Meseta, avoiding the snows of the Middle Atlas.¹⁶ They cultivate barley and wheat on lands sometimes irrigated, where also appears an occasional fig tree or vine. Then leaving the *Azaghar*, as they term the plain, for the neighboring tribes to enjoy at their ease, they resort to the *Jebel*. Their *duars* are strung along the valleys, where they cultivate a little maize, while their flocks graze on the undergrowth of the cedar forests (Fig. 20).

These migratory movements are not common in the Rif, where from all accounts it appears that live stock is a secondary resource of the population. Probably the same is true of the Jebala. The same phenomenon appears in Kabylia. However, the extension in the Rif, especially in the eastern part, of marls and soft schists and the development of a “bad lands” topography suitable only for grazing restores in some measure the importance of pastoral

¹⁶ *Bull. Soc. de Géogr. du Maroc*, No. 9, p. 43.



FIG. 15



FIG. 16

FIG. 15—Villages and cultivations in the valley of the upper Wadi el Abid, a little down stream from Wauizert. Altitude of airplane 3,500 meters.

FIG. 16—"Perched" villages near fields and orchards in part cultivated by irrigation. Eastern slope of the upper Wadi el Abid. Vertical view. Scale approximately 1:11,000.

life in the region. Occasionally in the Werga, for instance, the inhabitants of the hill crest villages utilize the lower valleys as pasture grounds.

The highest crests of the Atlas are frequented by the flocks in the middle of the summer. At elevations over 3,200 meters, not far from the patches of snow unmelted still in the August sun, the writer has often seen stray tents in these high solitudes.



FIG. 17—Oasis on an alluvial fan where a gorge opens onto the plain of Muluya. A little to the north of Itzer. Two *ksur* (fortified villages) can be distinguished on the nearer and farther edges of the fan. Altitude of airplane 3,500 meters.

THE MOROCCAN MOUNTAINS AS A REFUGE

It is commonly known that the Algerian mountains have served time and again as a refuge for the Berber populations. The Kabyles occupy a massif which they have been well able to defend, but at the same time they suffer from overpopulation. The Moroccan mountains, broader and with higher relief, have likewise afforded refuge for ancient populations. The mountains have never been subjugated; their people have never paid the imposts of the Sultans. Today the traditional rôle is continued in the bitter opposition offered to French and Spanish penetration. On the other hand, the mountaineer frequently sets out from his refuge to seek his fortune in the plains. It was against the neighboring Berber tribes that the walls of Meknes were designed, though they have not always proved invulnerable.

How has this aspect of mountain influence affected the people? In the first place there is the marked contrast between the northern plains—where, save for the walled cities, the population has a seminomadic air—and the mountains, where human establishments in general appear more stable and

more highly individualized. Far from the routes of invasion and the exactions of the fiscal authorities, the independent tribes of the *Bled Siba* form a superabundant population by comparison with the *Bled Makhzen*. Their relatively large number, in combination with a spirit of independence, is doubtless one of the causes which have retarded French penetration in the mountains, parts of which are still not subjected.



FIG. 18—"Bald" oasis of unknown name in the mountains of the High Atlas, valley of the Anzegmir, about 70 kilometers above its junction with the Muluya. Juniper (?) bushes on the slopes. Altitude of airplane 4,100 meters.

The example of the Rifian valley of Tarzut, chanced upon in an aerial exploration of the unconquered country, is highly suggestive of this rôle of refuge. To the north of the valley of Werga, beyond the villages which control it from a little distance, one passes into a brush-covered country apparently absolutely deserted over a zone 25 kilometers broad. Traversing this one arrives at the foot of the high summit of Tarzut (2,459 meters), where in a recess of the mountain an astonishing sight greets the eye. For a space of 5 kilometers a marquetry of minute patches of cultivation covers the alluvial fans which encumber the narrow valley (Figs. 21 and 22). Orchards, a scattering of tiny dwellings with pointed roofs, and terraced cultivations on the highest slopes combine to make a little world complete in itself and remote as possible from the plains. No need for the inhabitant of the Tarzut valley to seek security by high walls, by mobility, or by strategic position: he finds it in his retired situation. According to report these mountaineers are extremely industrious: they fabricate weapons and cloth for use as exchange commodities. This protective rôle is not played,



FIG. 19



FIG. 20

FIG. 19—Orchards at the foot of the Middle Atlas on the border of the plain of Tadla. Vertical view. Scale approximately 1:6,000.

FIG. 20—The Middle Atlas to the east of Mrirt. Calcareous plateaus of slightly folded strata; forests of cedars and clearings. Altitude of airplane 3,500 meters.



FIG. 21



FIG. 22

FIG. 21—A part of the overpopulated valley of Tarzut in the heart of the Rif. Note the terrace cultivation, sometimes carried to high elevations on the slopes. Altitude of airplane 3,000 meters.

FIG. 22—Vertical view of a part of the Tarzut valley showing the crowded villages and the extreme fragmentation of the cultivated land.

however, by all the mountainous regions of Morocco. As we have seen, the Zaïans, who claim a part of the Middle Atlas, use it for the practice of transhumance. The valleys of the High Atlas and all the basin of the Muluya are occupied by *kasbas* and *ksur*. But certain aerial photographs, such as Figure 14, show open agglomerations situated in the heart of the Atlas. It should, however, be remarked that each house is in plan the hollow square, a primitive fortification. Another suggestive example comes from the same region: the village of Wauizert, chief place and market of a mountain canton, is situated at the bottom of a valley in which it is the most elevated agglomeration. As for the *pays insoumis* of the central and northern Atlas, when they are better known they will furnish a yet greater diversity of illustration of human existence secreted in mountain fastnesses far from the troubled life of the plains.